

FIG. 1

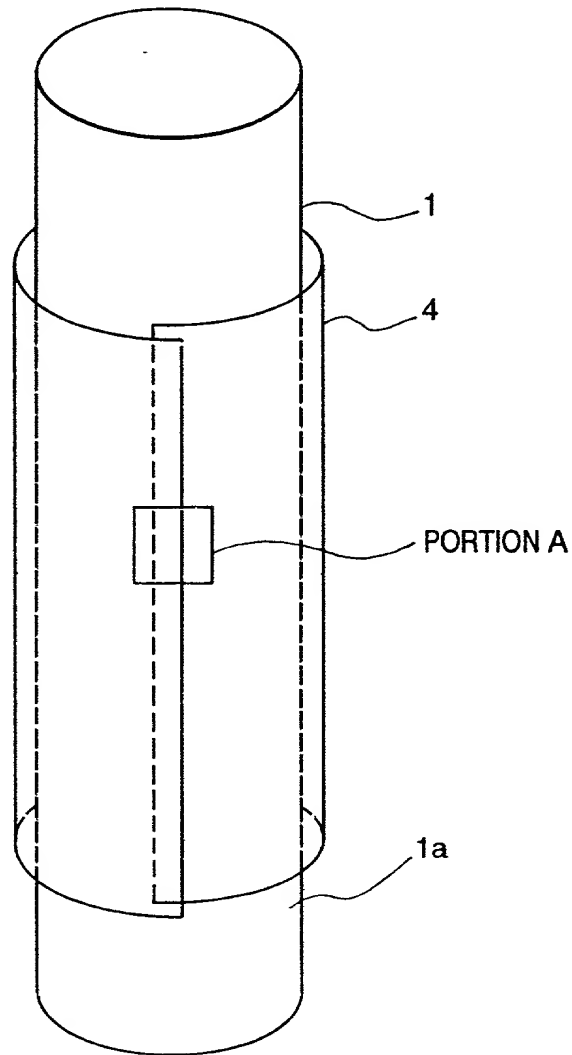


FIG. 2

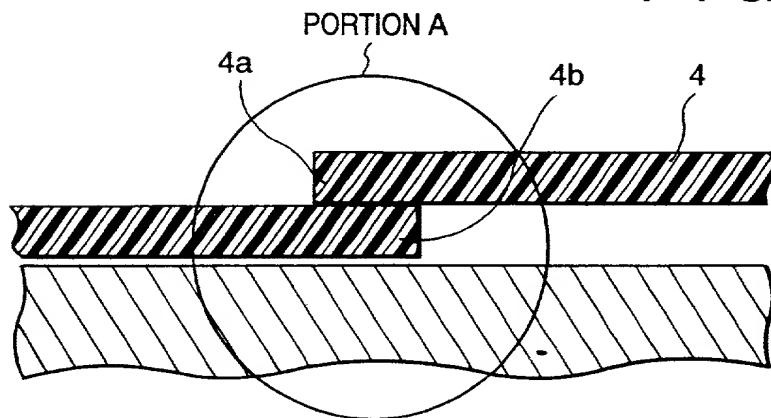


FIG. 3

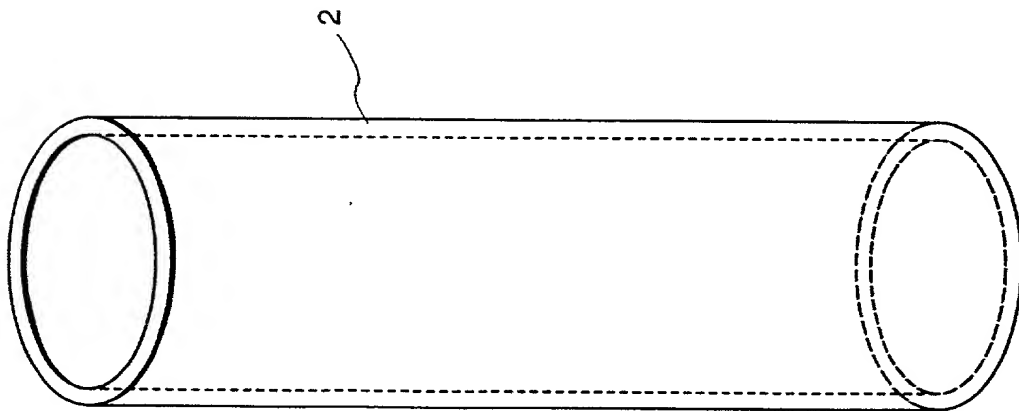


FIG. 4

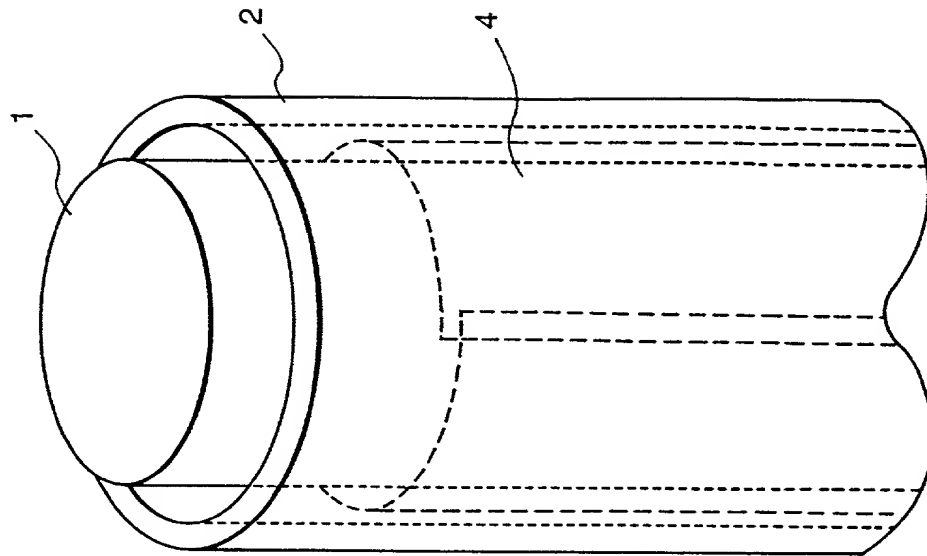
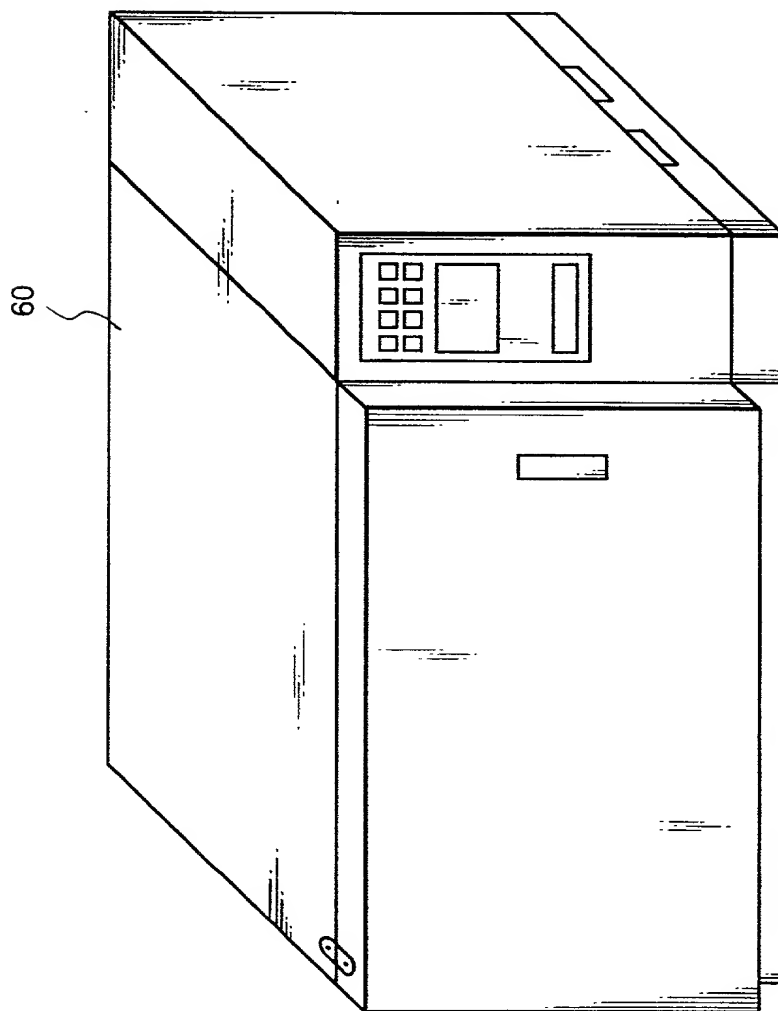


FIG. 5



TUBULAR MOLD

FIG. 6

TEMPERATURE ; ROOM TEMPERATURE

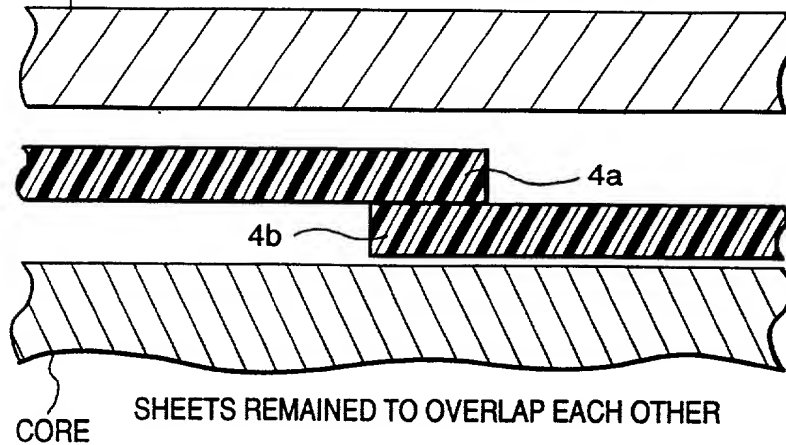


FIG. 7

TUBULAR MOLD

TEMPERATURE WAS RAISED

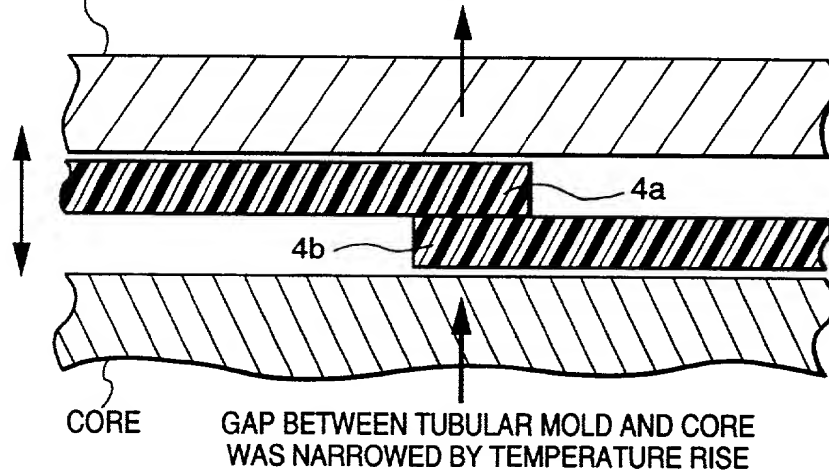


FIG. 8

TUBULAR MOLD

TEMPERATURE ; FILM WELDABLE TEMPERATURE

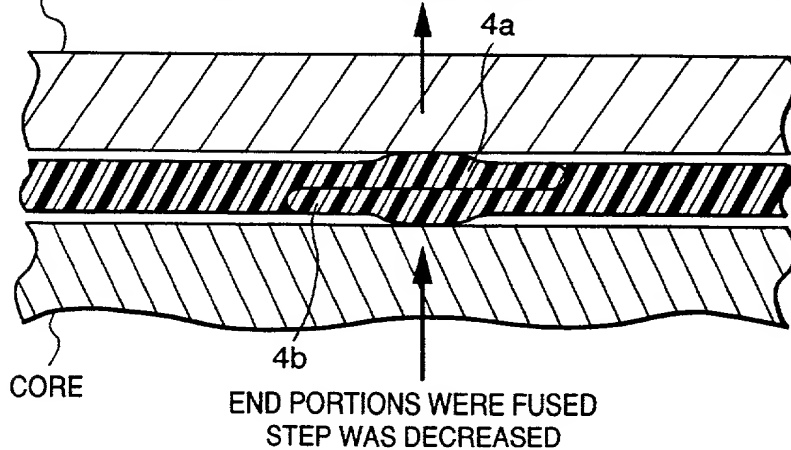
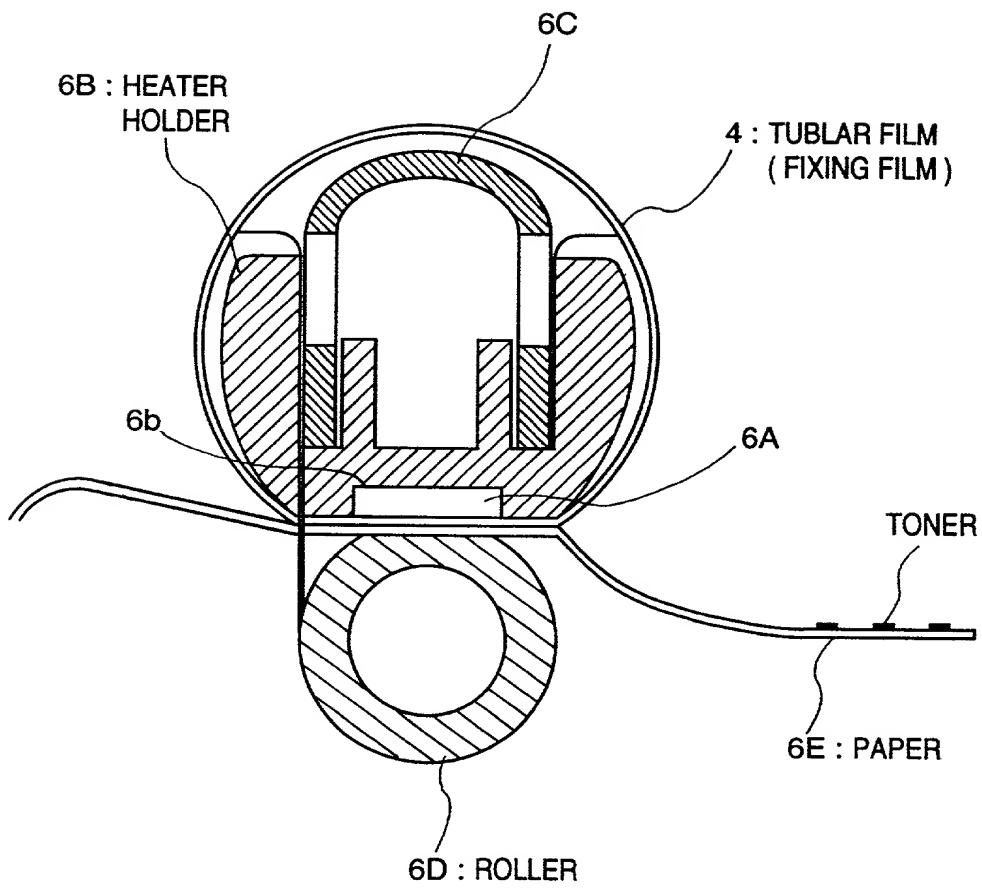




FIG. 10



A schematic diagram of a cylindrical device. A helical coil, labeled 4, is wound around a central cylinder. The cylinder has a top flange labeled 12A and a bottom flange labeled 8. A vertical dashed line, labeled 10, indicates a central axis or internal channel. A horizontal dashed line, labeled 14, is positioned within the cylinder. Arrows indicate flow: an arrow points right into the top of the cylinder, and an arrow points left out of the bottom. Three arrows point downwards from the bottom of the cylinder.

FIG. 14

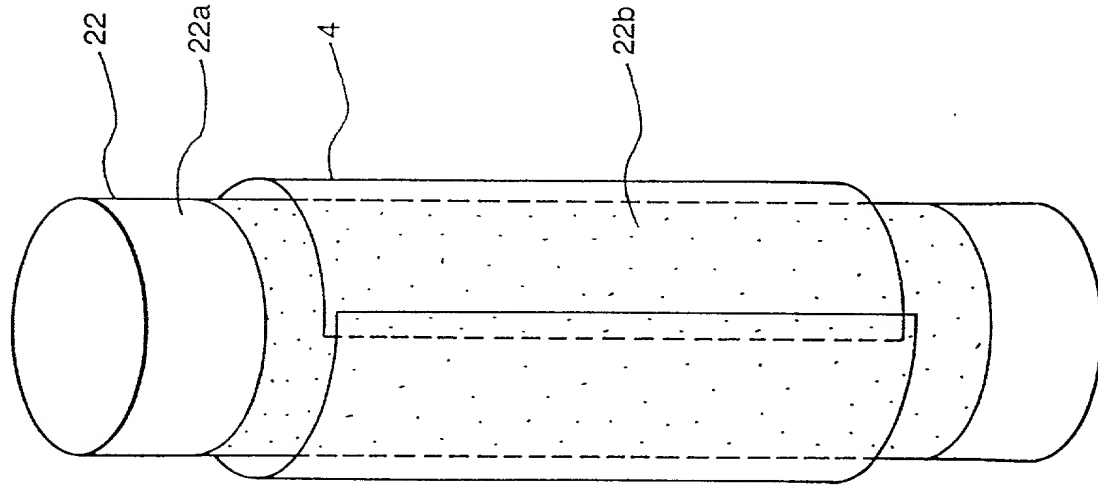


FIG. 15

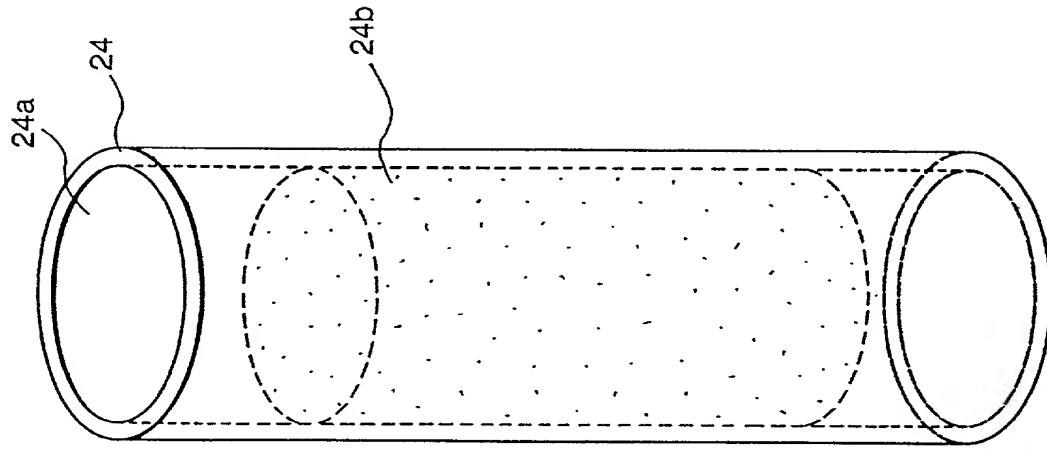




FIG. 12

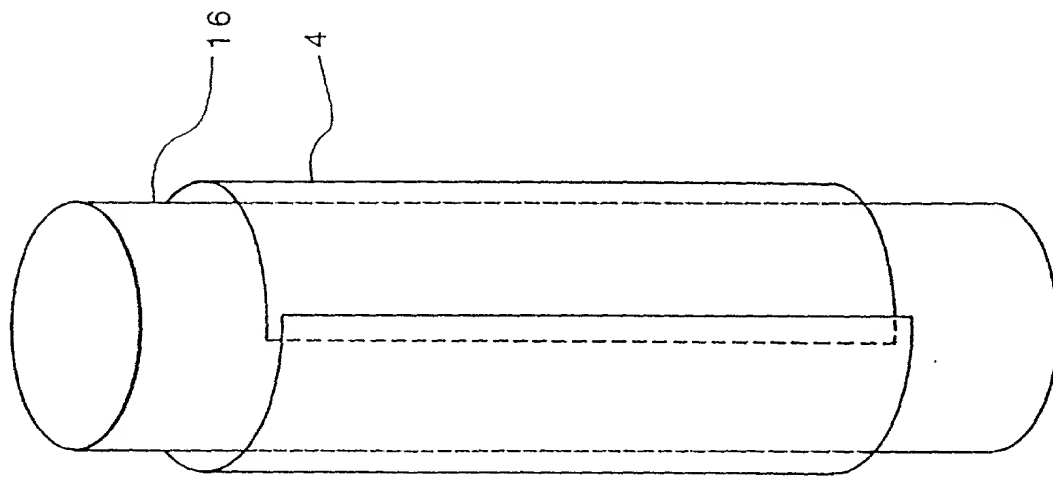


FIG. 13

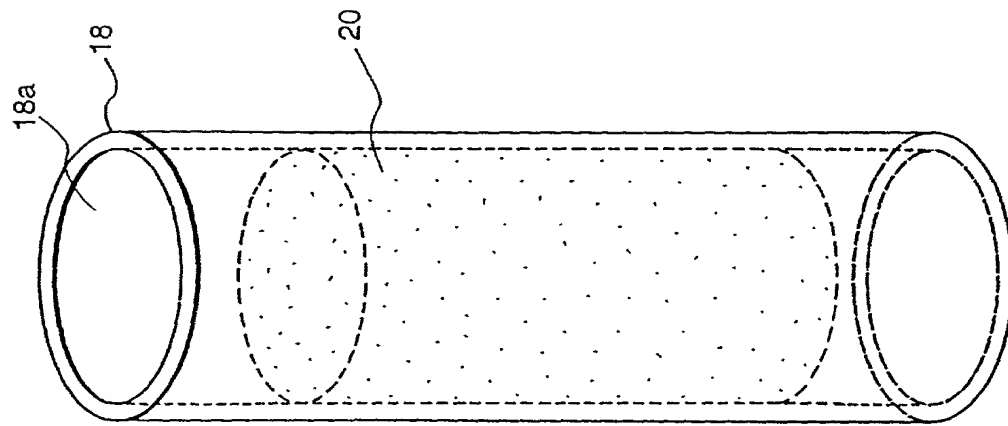


FIG. 16

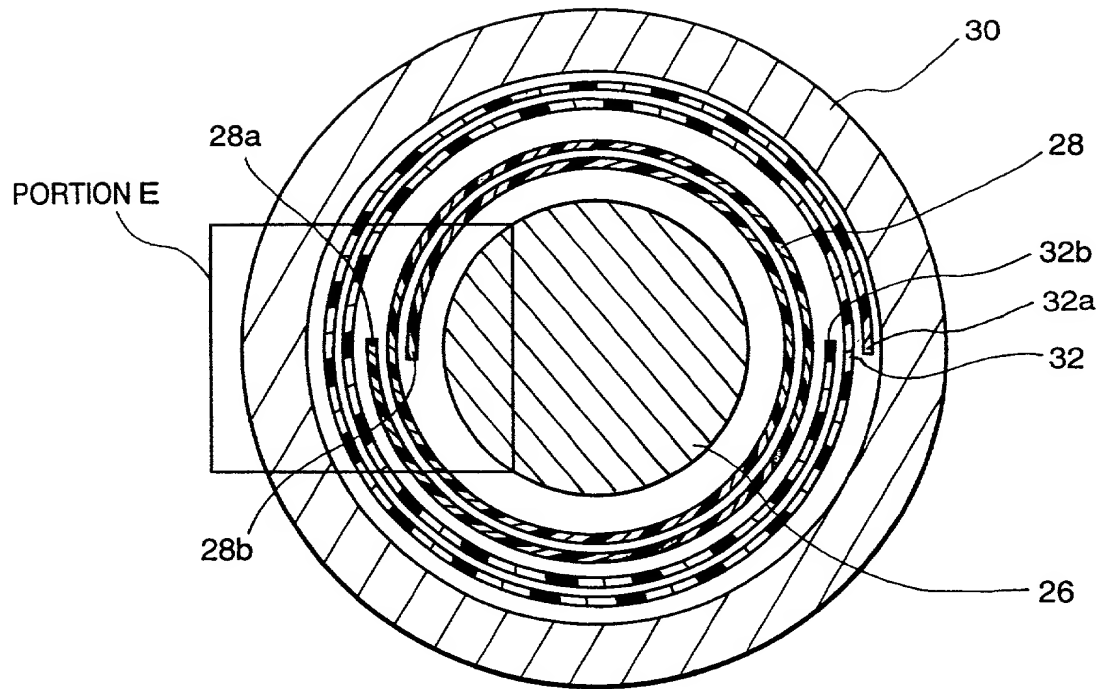


FIG. 17

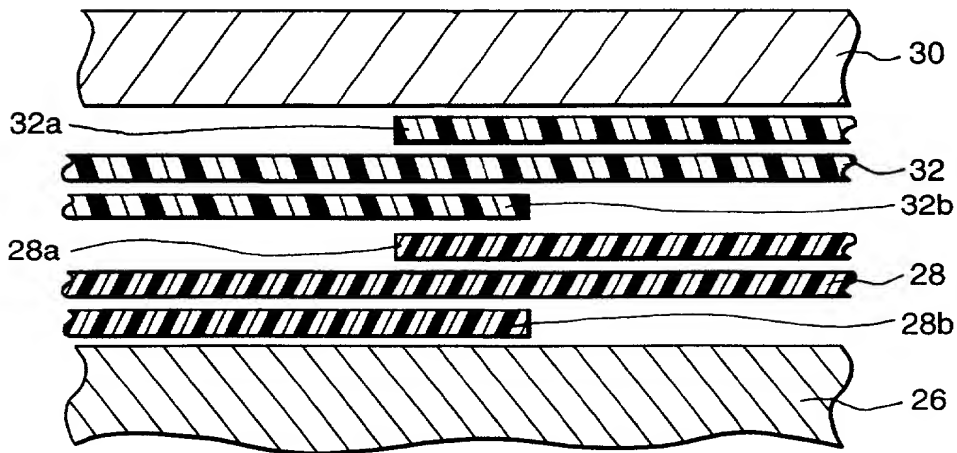


FIG. 18

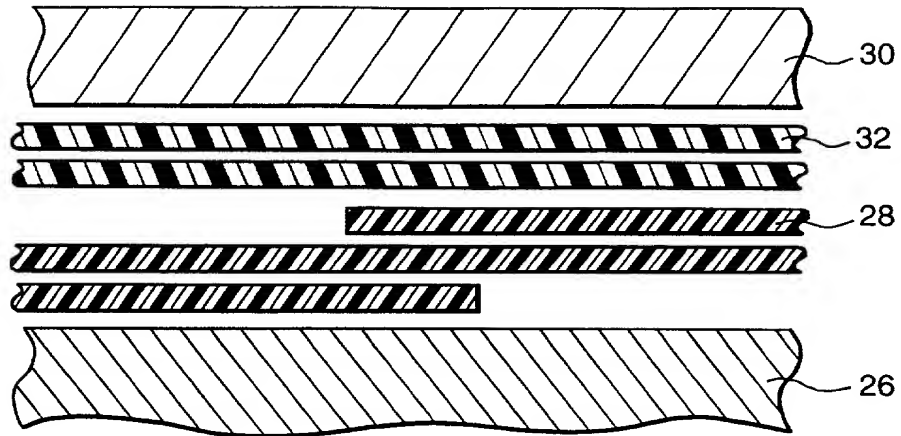


FIG. 19

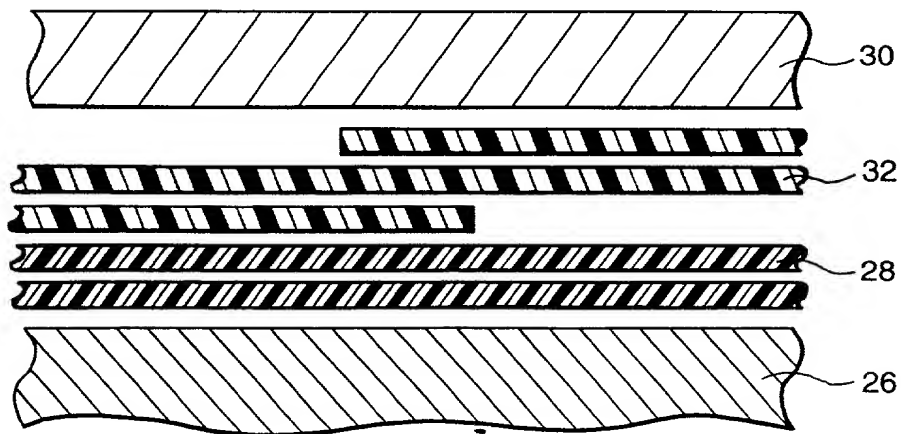


FIG. 20

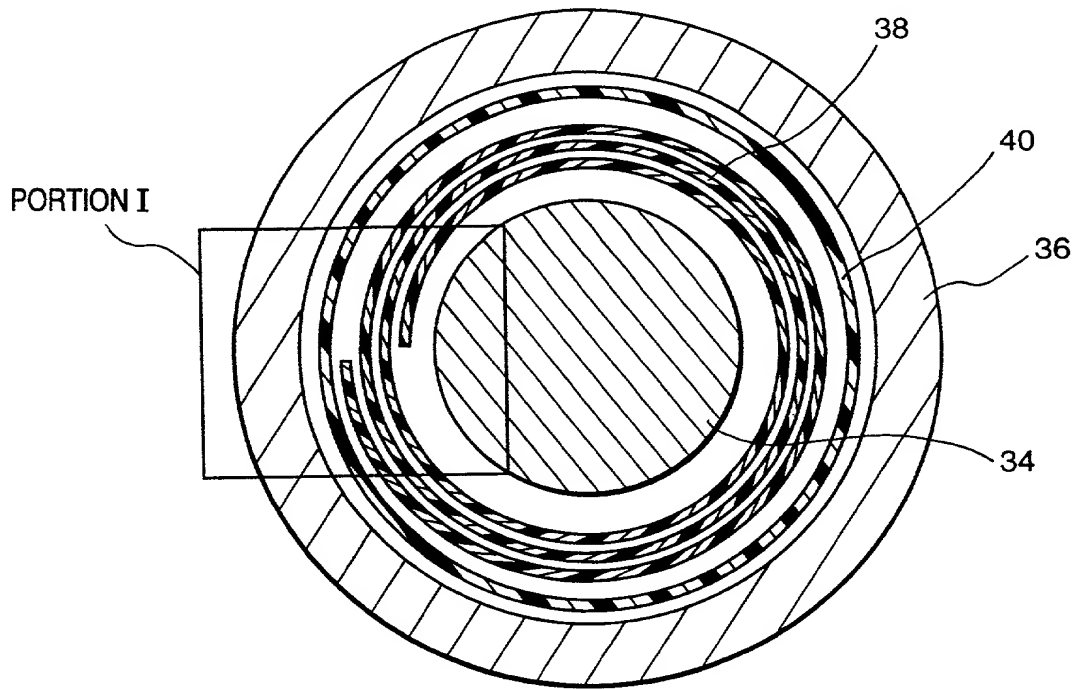


FIG. 21

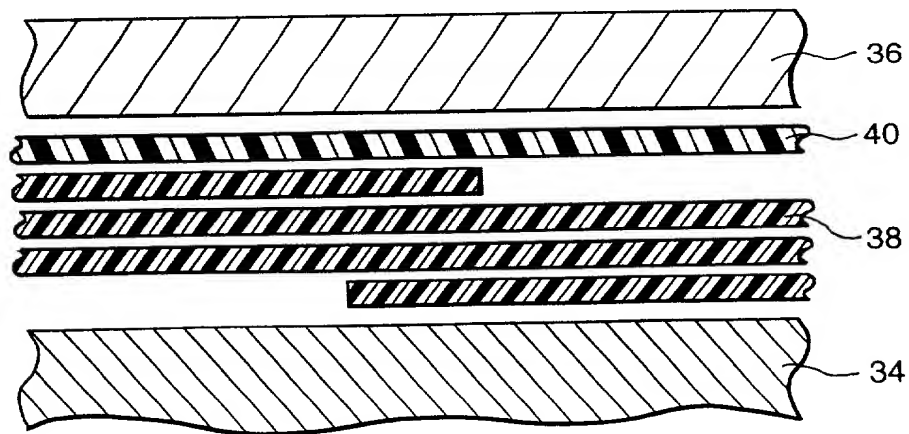


FIG. 22

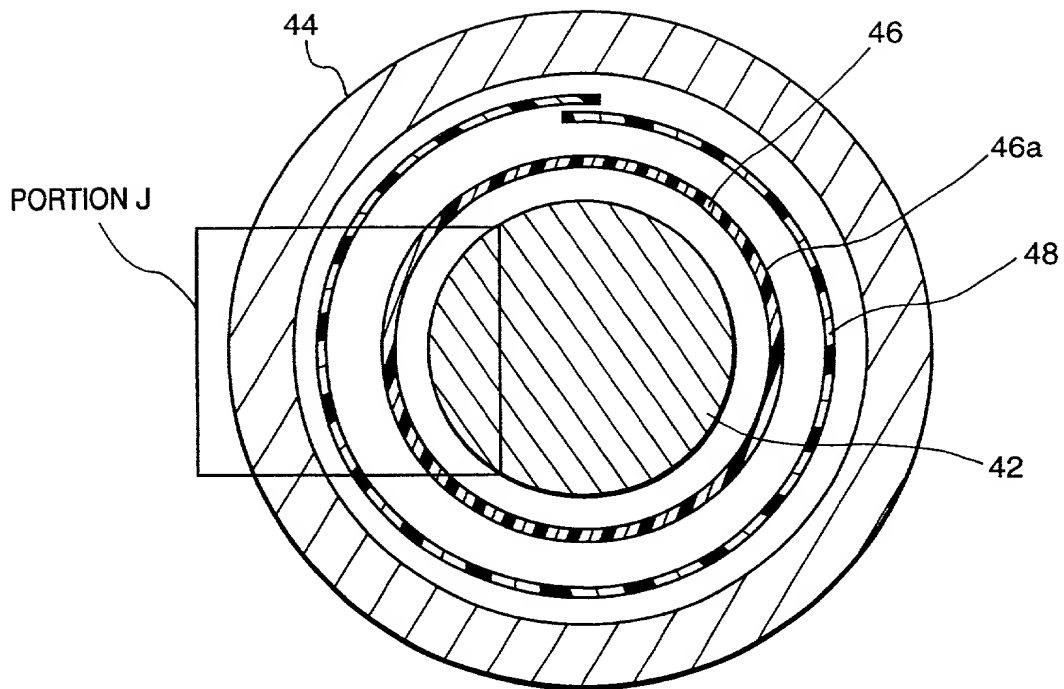


FIG. 23

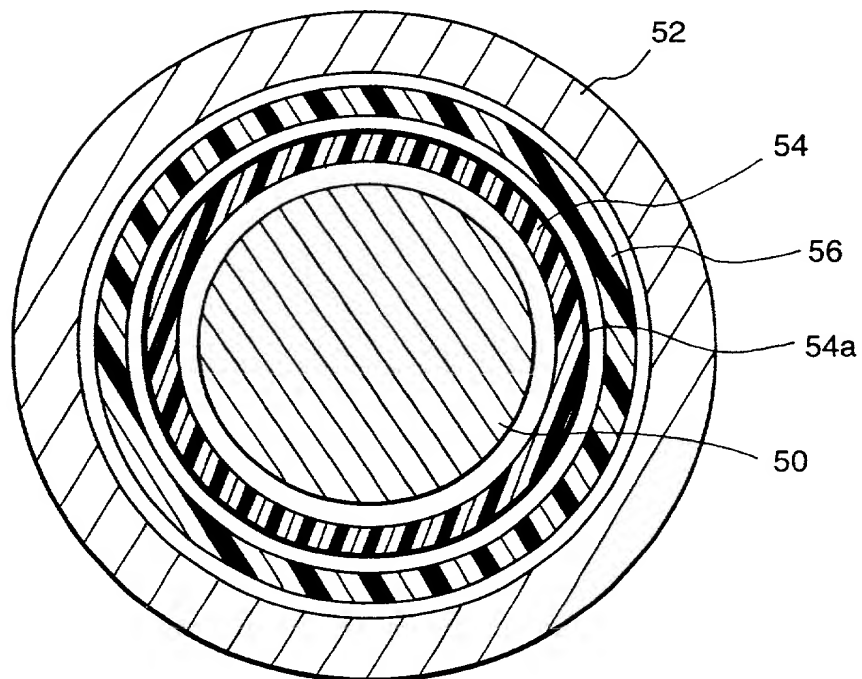


FIG. 24

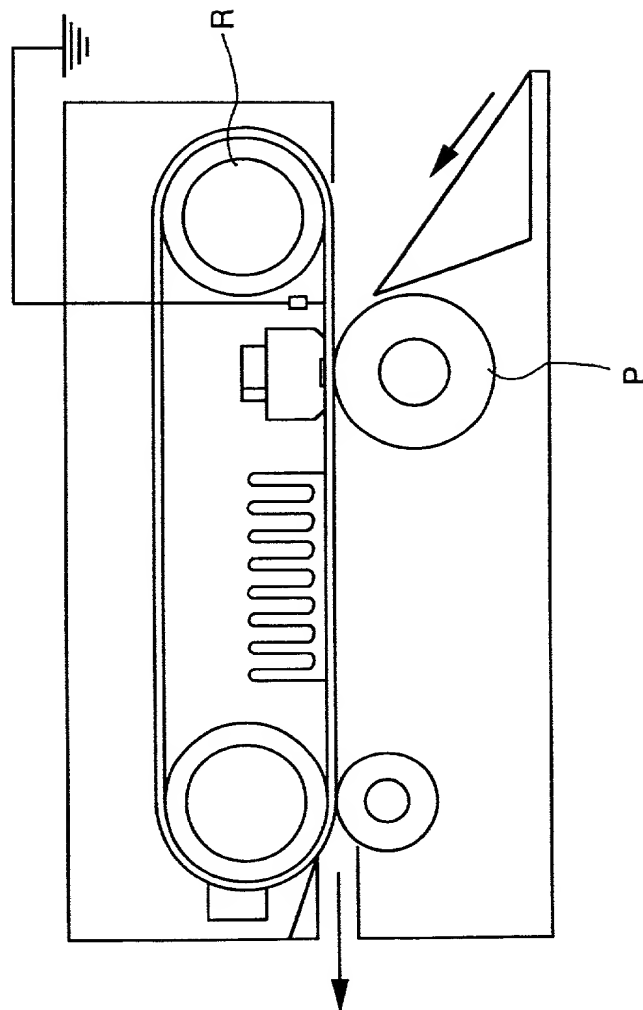


FIG. 25

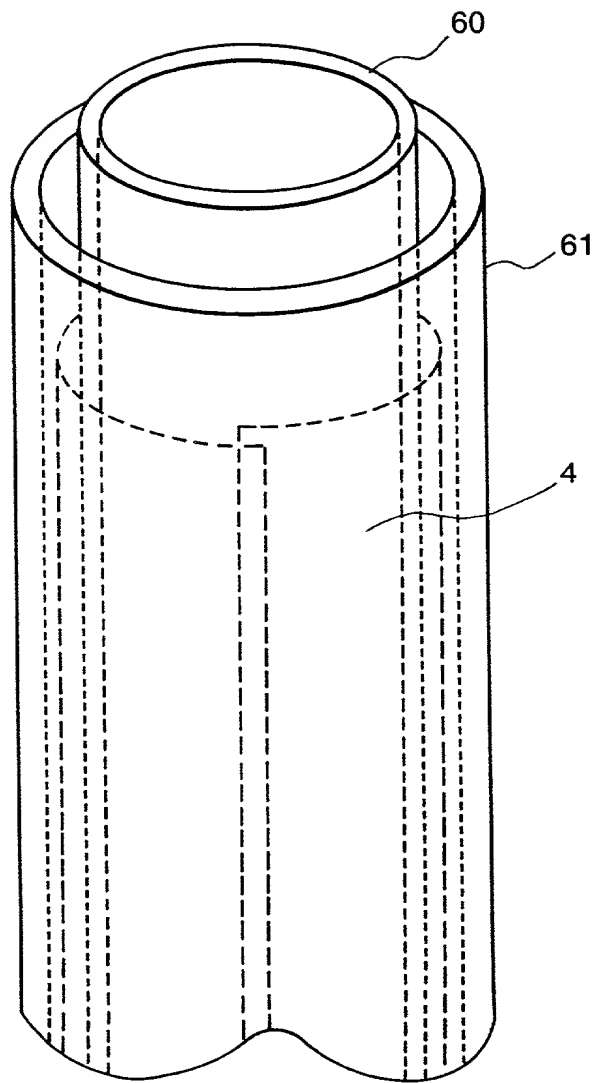


FIG. 26

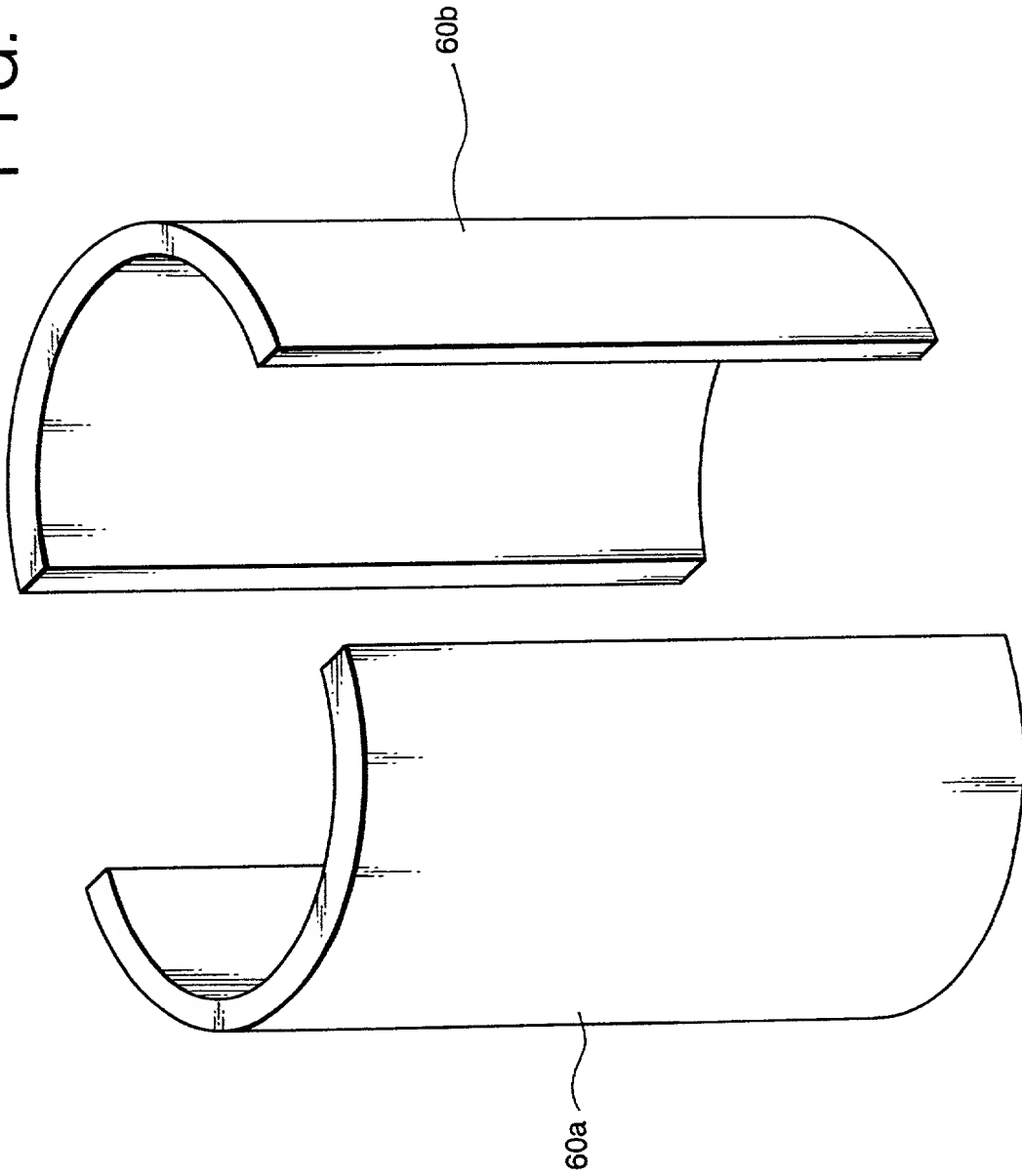




FIG. 27

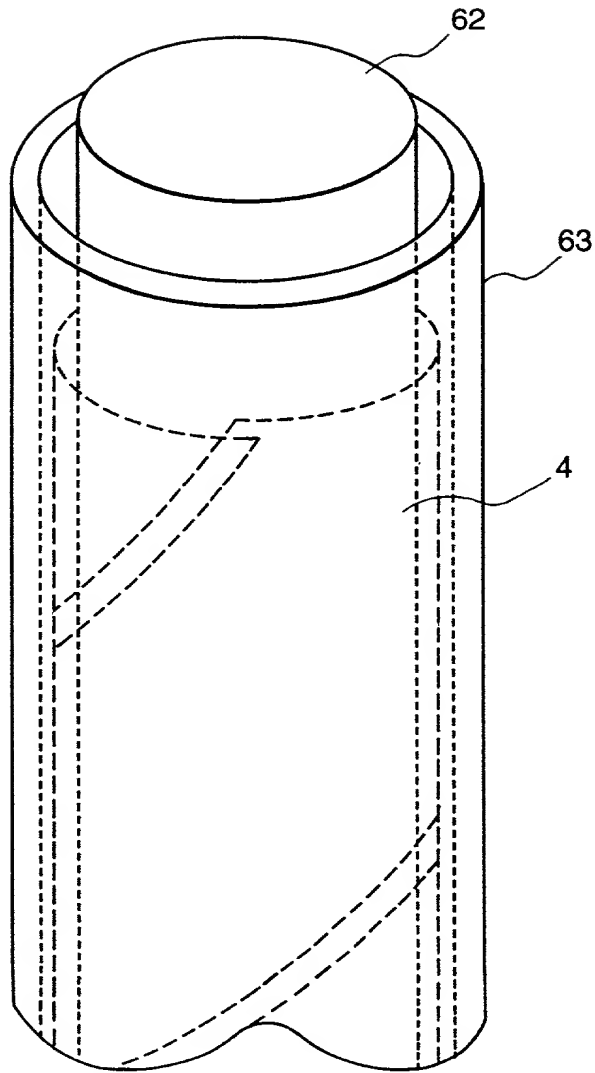


FIG. 28

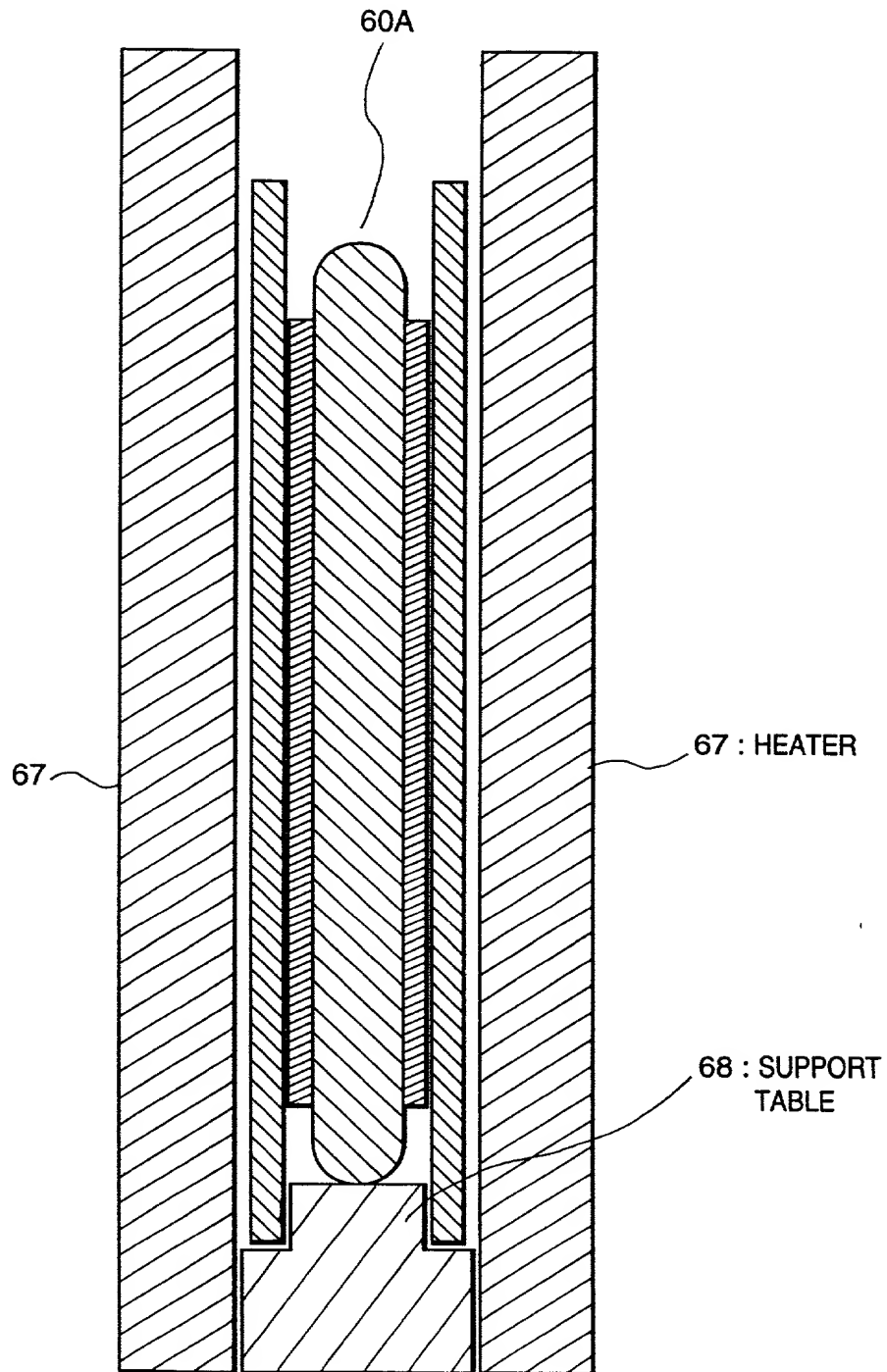


FIG. 29

No	COLUMNAR MEMBER	THERMAL EXPANSION (/ °C) COEFFICIENT	TUBULAR MOLDING MEMBER	THERMAL EXPANSION (/ °C) COEFFICIENT
1	Al	$2.4 \times 10^{-5}$	STAINLESS STEEL	$1.5 \times 10^{-5}$
2	Al	$2.4 \times 10^{-5}$	GLASS	$5.5 \times 10^{-7}$ (QUARTZ) $9.9 \times 10^{-6}$ (SHEET GLASS)
3	PTFE	$10.0 \times 10^{-5}$	STAINLESS STEEL	$1.5 \times 10^{-5}$
4	PTFE	$10.0 \times 10^{-5}$	Al	$2.4 \times 10^{-5}$
5	PTFE	$10.0 \times 10^{-5}$	GLASS	$5.5 \times 10^{-7} \sim 9.9 \times 10^{-6}$

FIG. 30

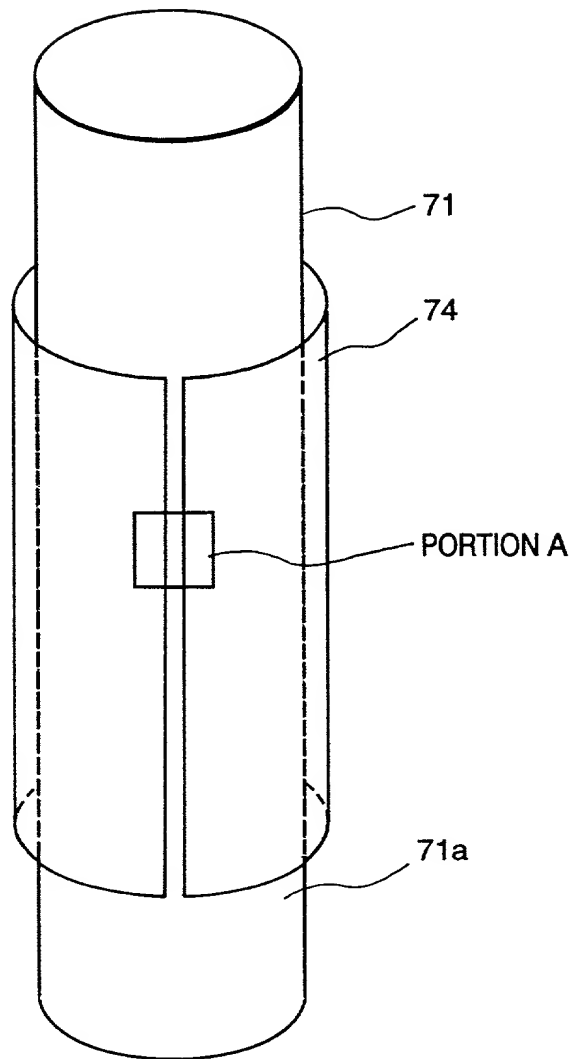


FIG. 31

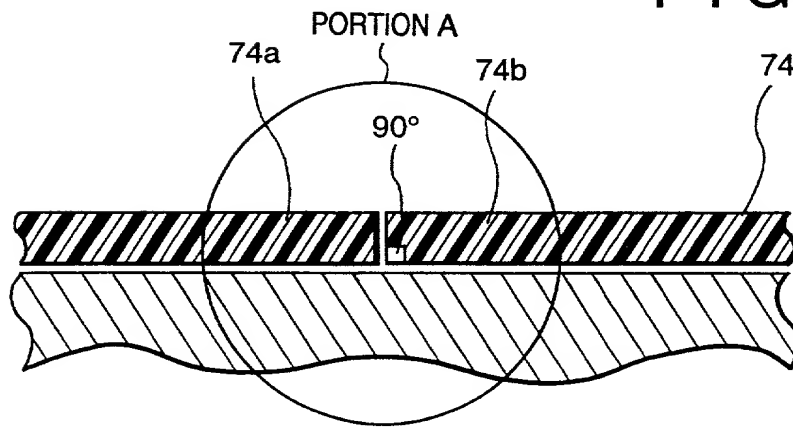


FIG. 32

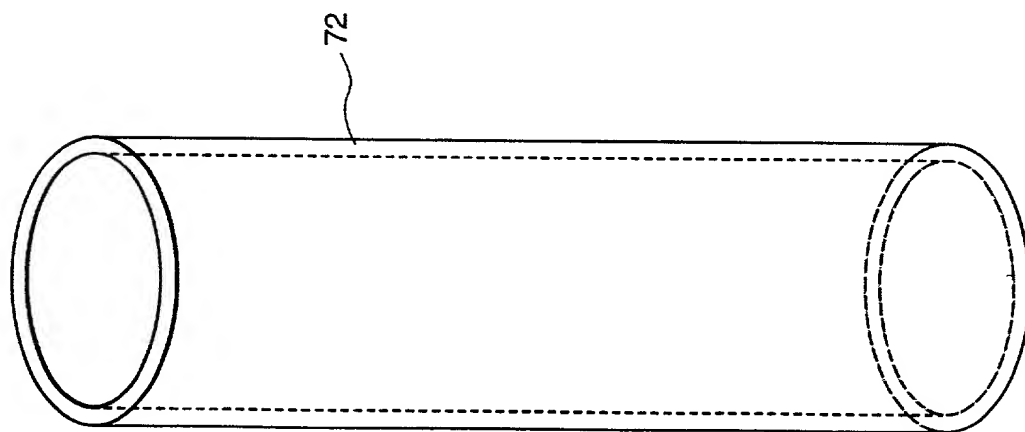


FIG. 33

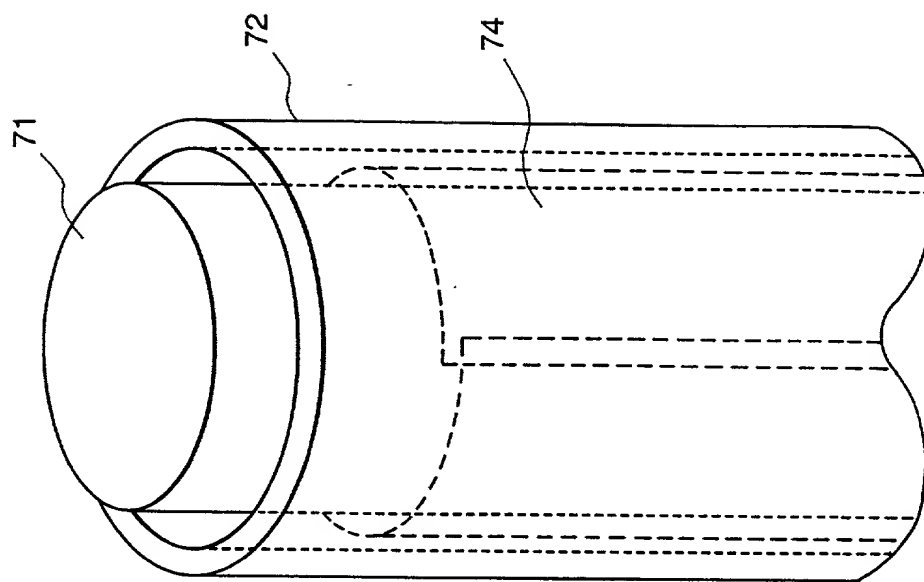


FIG. 34

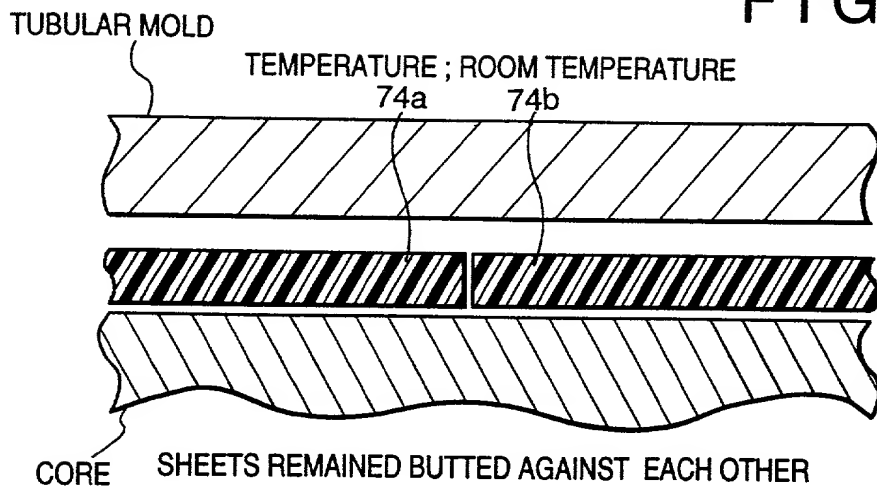


FIG. 35

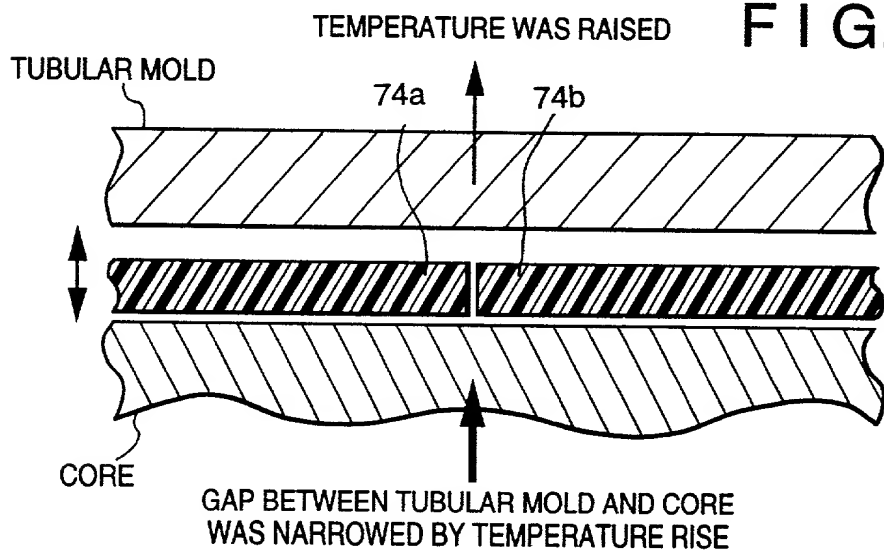


FIG. 36

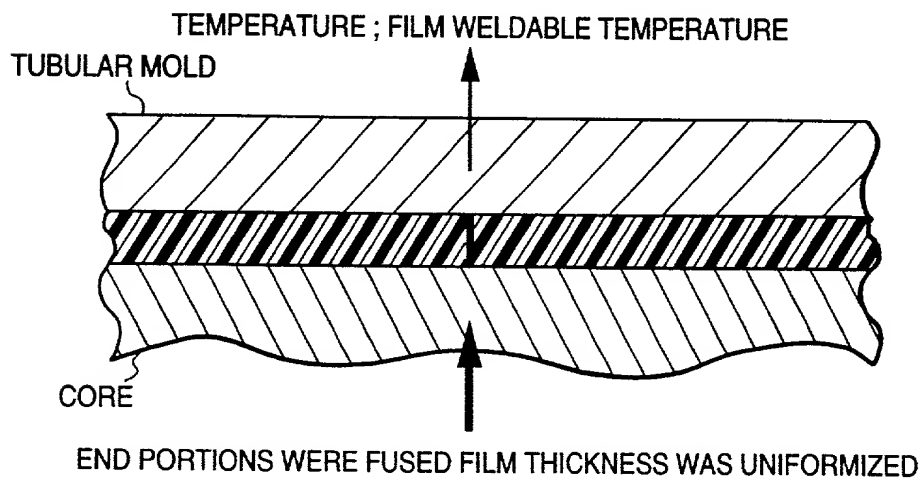


FIG. 37

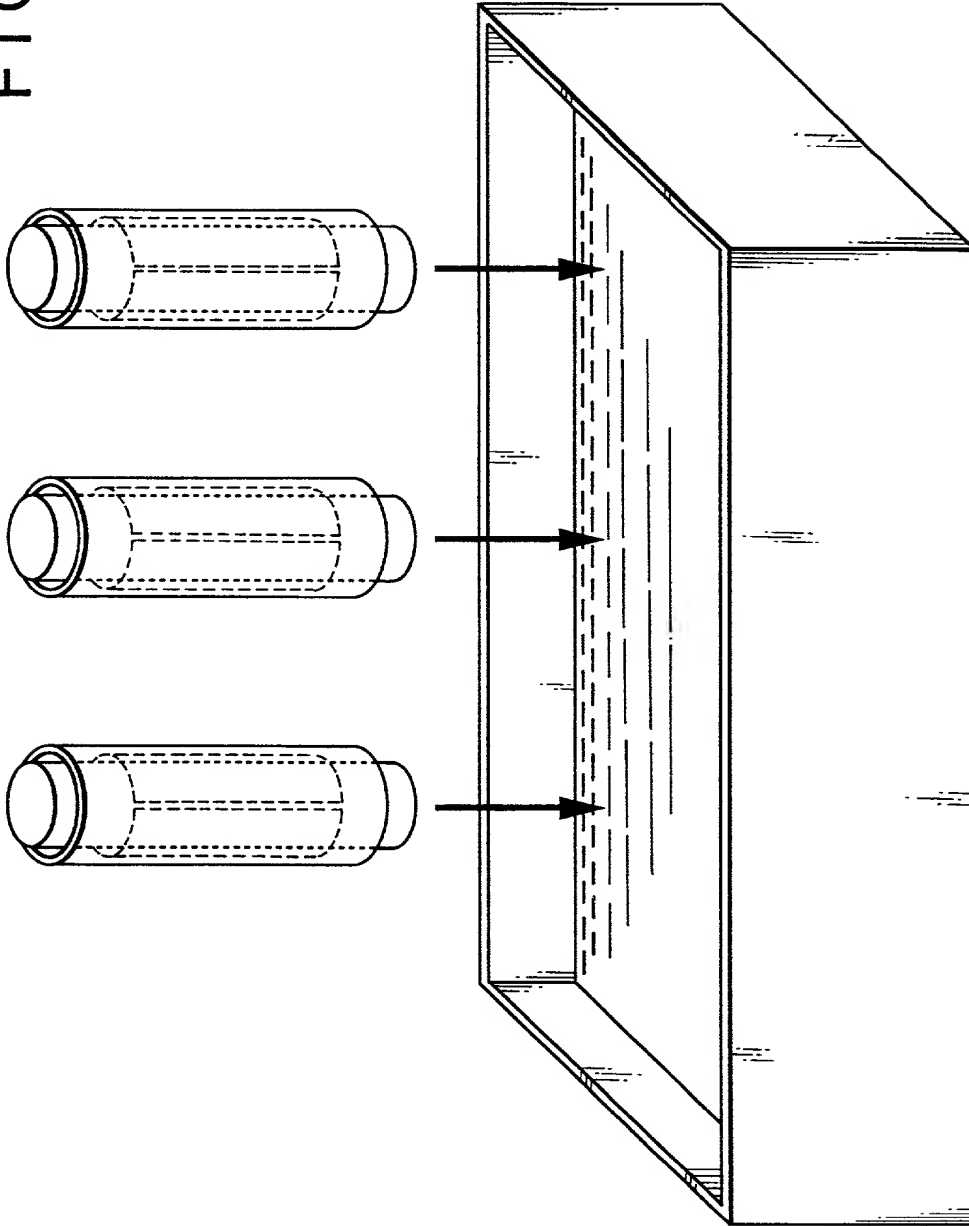


FIG. 38

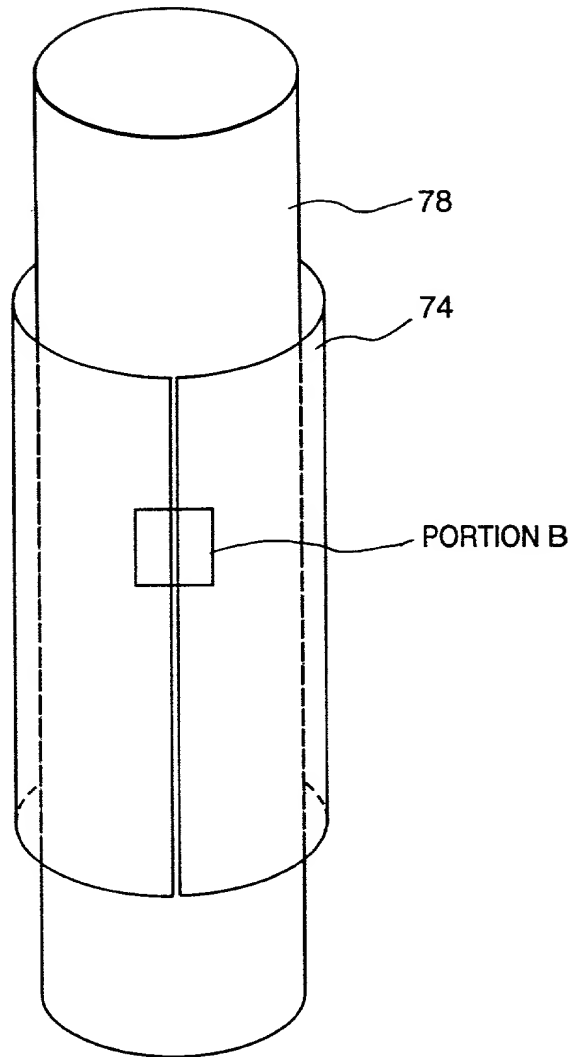


FIG. 39

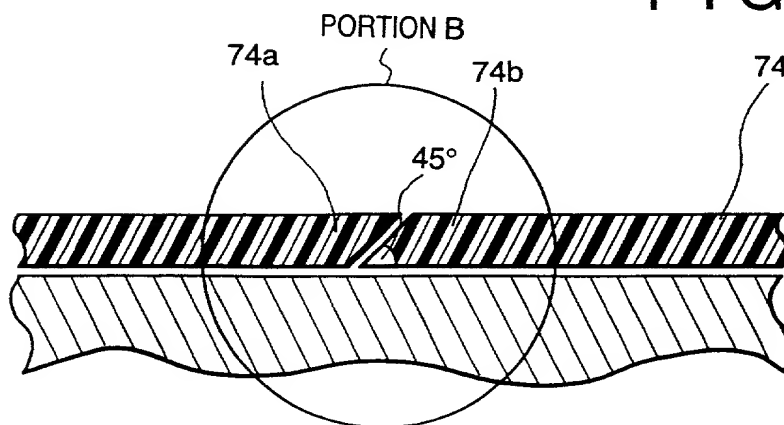




FIG. 40

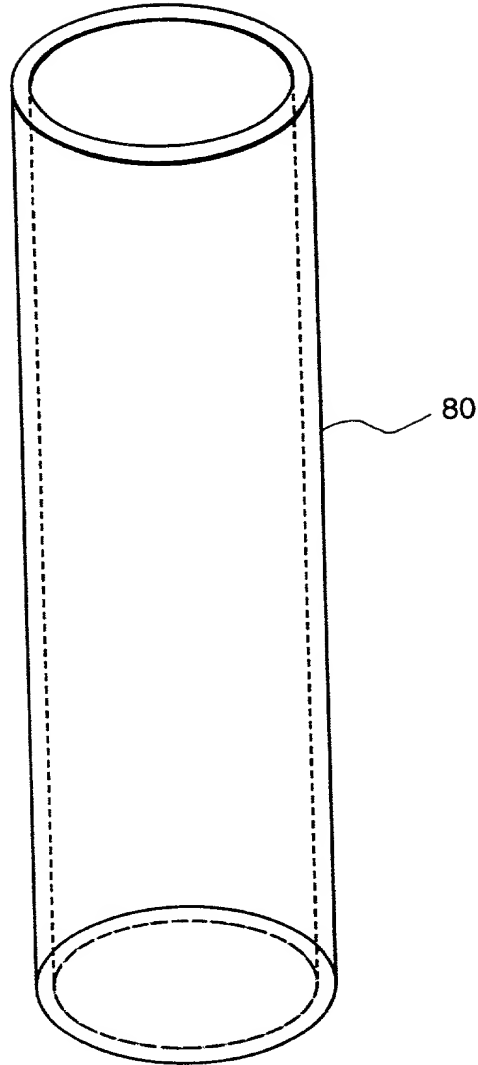


FIG. 41

MEASURED SAMPLE	TENSILE STRENGTH ( Kg / cm <sup>2</sup> )
TENSILE STRENGTH OF CONNECTED PORTION IN ELEVENTH EMBODIMENT	700 ~ 780
TENSILE STRENGTH OF CONNECTED PORTION IN TWELFTH EMBODIMENT	930 ~ 990
TENSILE STRENGTH OF PEEK FILM ( WITH NO CONNECTED PORTION )	990 ~ 1000

( TEST METHOD : ASTM ; D638, 23°C )

FIG. 42

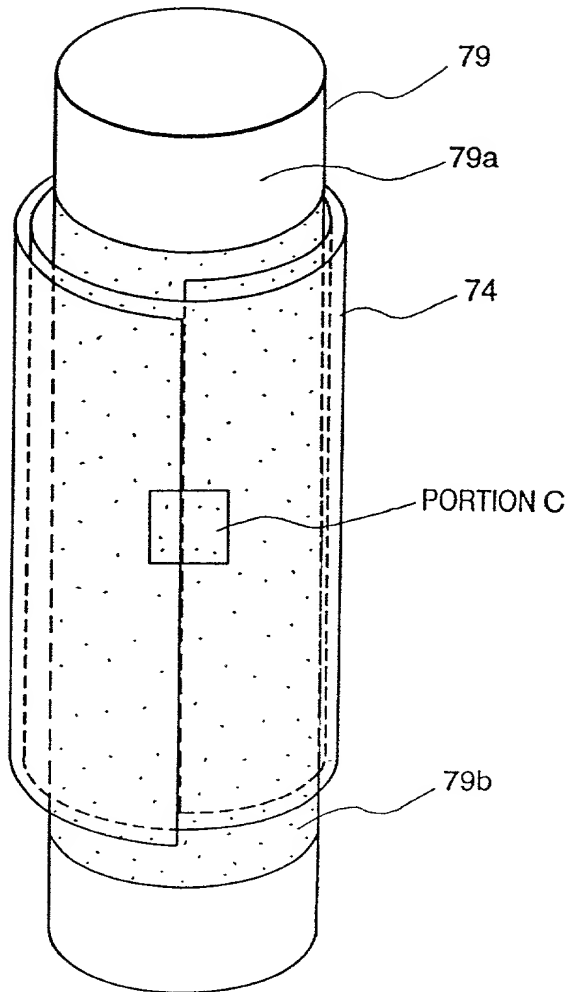


FIG. 43

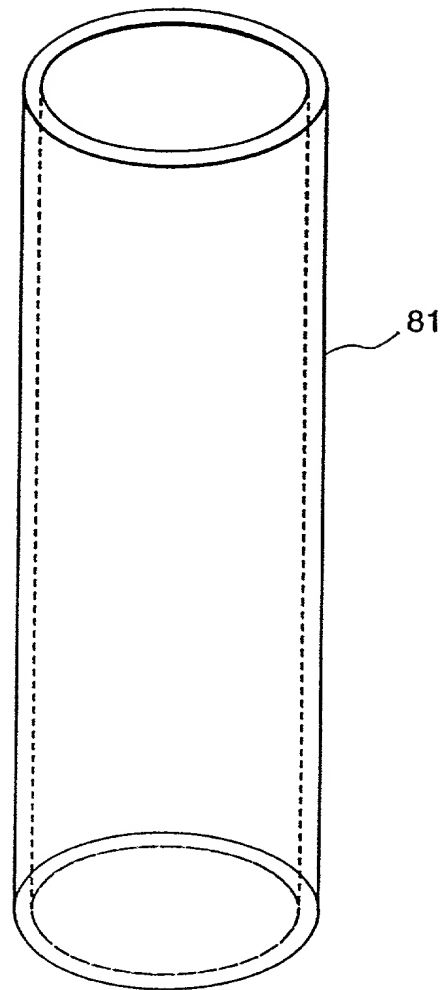


FIG. 44

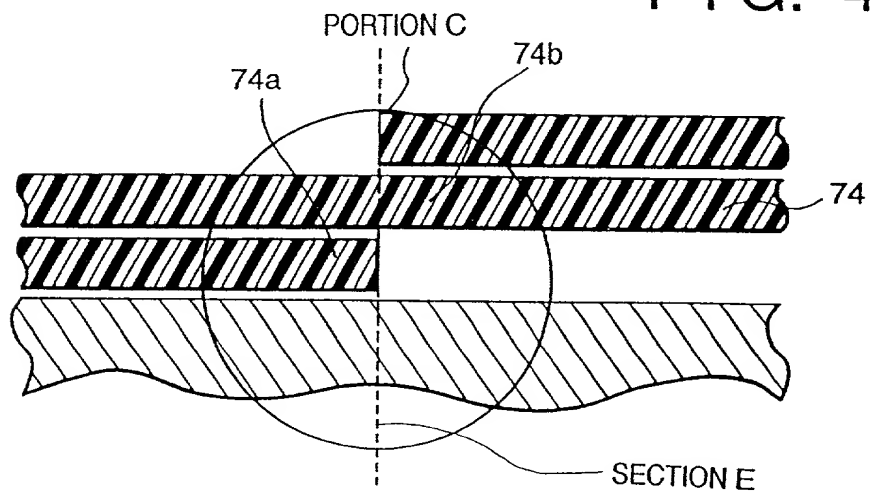


FIG. 45

TUBULAR MOLD

TEMPERATURE ; ROOM TEMPERATURE

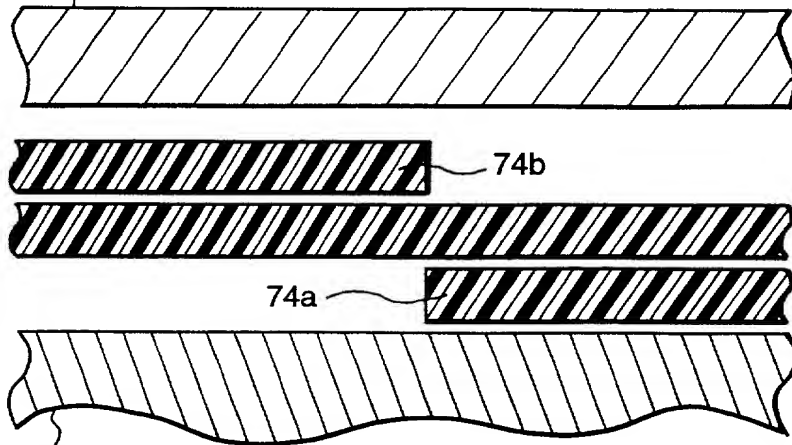
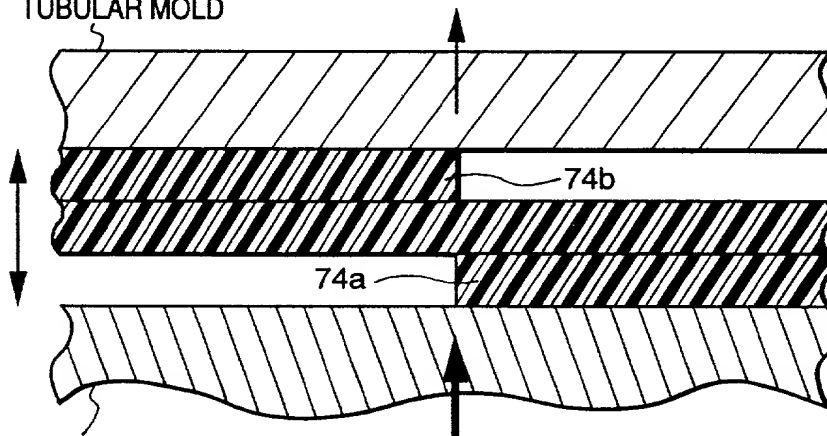


FIG. 46

TEMPERATURE WAS RAISED

TUBULAR MOLD

CORE



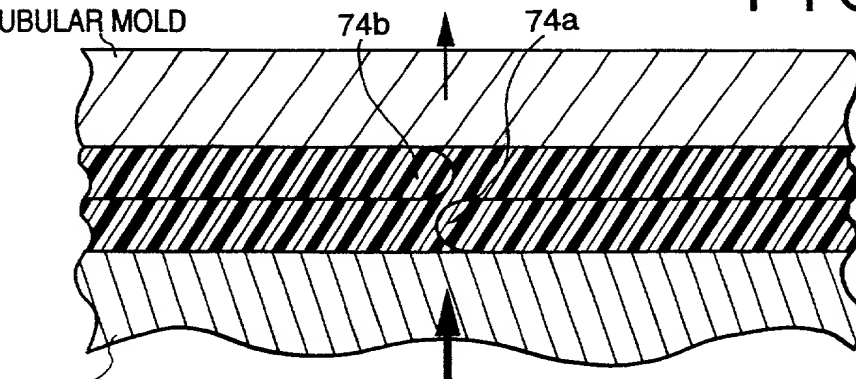
GAP BETWEEN TUBULAR MOLD AND CORE  
WAS NARROWED BY TEMPERATURE RISE

FIG. 47

TEMPERATURE ; FILM WELDABLE TEMPERATURE

TUBULAR MOLD

CORE



END PORTIONS WERE FUSED  
STEP WAS DECREASED  
FILM THICKNESS WAS UNIFORMIZED

FIG. 48

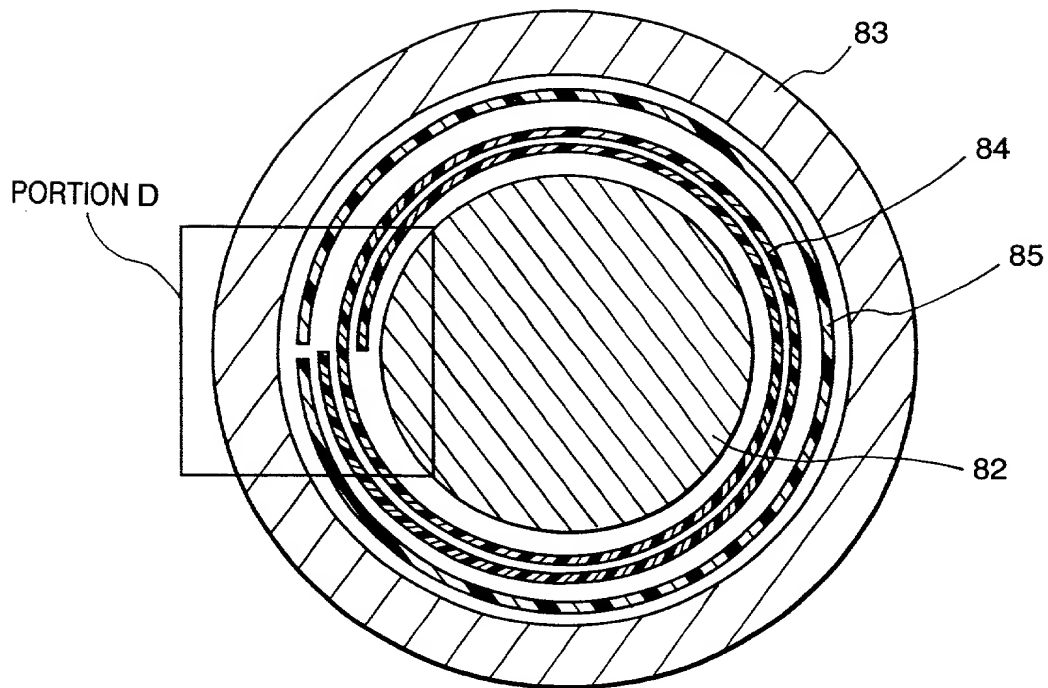


FIG. 49

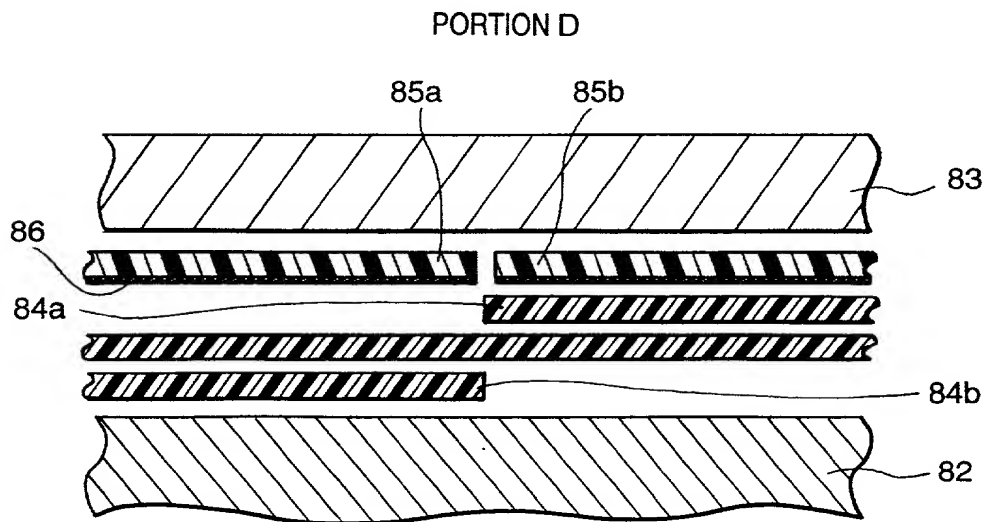


FIG. 50

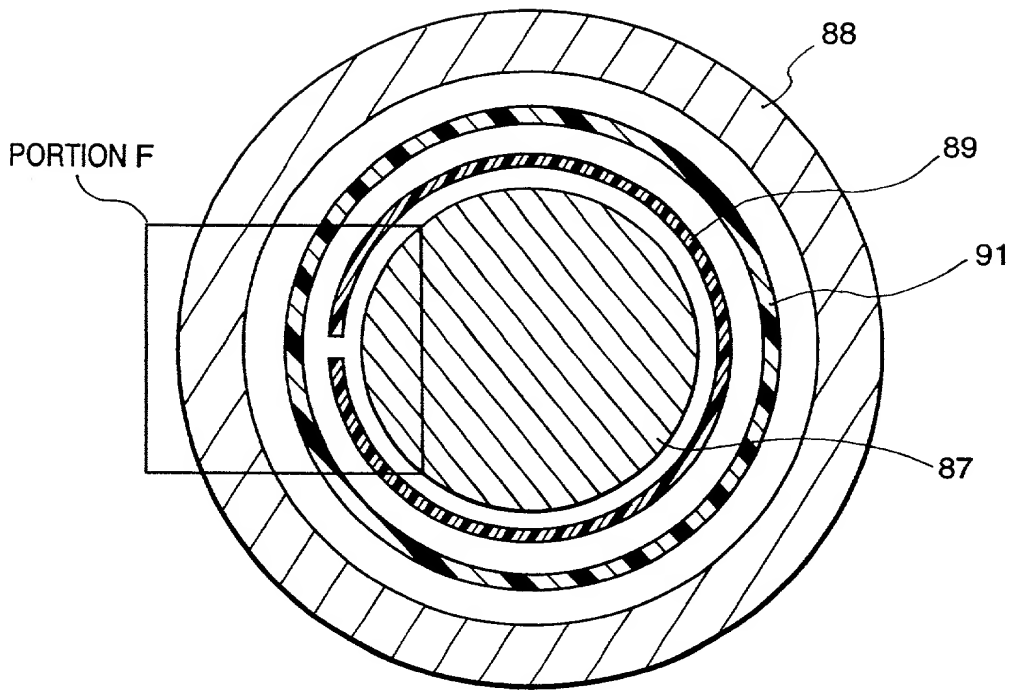


FIG. 51

PORTION F

